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01 JUN 2005

PCT/DE2003/004014

PATENT COOPERATION TREATY



PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

| | | |
|---|---|---|
| Applicant's or agent's file reference 11411p | FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416) | |
| International application No. PCT/DE2003/004014 | International filing date (day/month/year) 05 December 2003 (05.12.2003) | Priority date (day/month/year) 05 December 2002 (05.12.2002) |
| International Patent Classification (IPC) or national classification and IPC H01L 21/764 | | |
| Applicant X-FAB SEMICONDUCTOR FOUNDRIES AG | | |

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| 1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36. |
| 2. This REPORT consists of a total of <u>5</u> sheets, including this cover sheet. <input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT). These annexes consist of a total of <u>1</u> sheets. |
| 3. This report contains indications relating to the following items: I <input checked="" type="checkbox"/> Basis of the report II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability IV <input type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input type="checkbox"/> Certain defects in the international application VIII <input type="checkbox"/> Certain observations on the international application |

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|---|---|
| Date of submission of the demand 15 June 2004 (15.06.2004) | Date of completion of this report 17 March 2005 (17.03.2005) |
| Name and mailing address of the IPEA/EP | Authorized officer |
| Facsimile No. | Telephone No. |

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/DE2003/004014

I. Basis of the report

1. With regard to the elements of the international application:*

- ☐ the international application as originally filed
- ☒ the description:
 pages 1-9, as originally filed
 pages _____, filed with the demand
 pages _____, filed with the letter of _____
- ☒ the claims:
 pages _____, as originally filed
 pages _____, as amended (together with any statement under Article 19
 pages _____, filed with the demand
 pages 1-4, filed with the letter of 01 March 2005 (01.03.2005)
- ☒ the drawings:
 pages 1/3-3/3, as originally filed
 pages _____, filed with the demand
 pages _____, filed with the letter of _____
- ☐ the sequence listing part of the description:
 pages _____, as originally filed
 pages _____, filed with the demand
 pages _____, filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language _____ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/fig _____

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rule 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International Application No.

PCT/DE 03/04014

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

| | | | |
|-------------------------------|--------|-----|-----|
| Novelty (N) | Claims | 1-4 | YES |
| | Claims | | NO |
| Inventive step (IS) | Claims | 1-4 | YES |
| | Claims | | NO |
| Industrial applicability (IA) | Claims | 1-4 | YES |
| | Claims | | NO |

2. Citations and explanations

This report makes reference to the following documents:

D1: US-A-5 508 234 (DUSABLON SR MICHAEL S ET AL) 16 April 1996 (1996-04-16)

D2: US-B1-6 335 261 (NATZLE WESLEY ET AL) 1 January 2002 (2002-01-01)

D3: US-A-4 533 430 (BOWER ROBERT W) 6 August 1985 (1985-08-06)

D4: US 2002/171118 A1 (FALTERMEIER JOHNATHAN E ET AL) 21 November 2002 (2002-11-21).

D3 is regarded as the prior art closest to the subject matter of claim 1. It discloses the following (the reference signs in parentheses refer to D3):

D3 shows in figures 4A to 4D that the cross-section of the trench has to assume a bottle shape in the course of the trench being formed (column 8, lines 12 and 13), which is made clear by reference sign 35. In order to ensure that the bottle shape is also retained, the coating 32 in figure 4A is applied prior thereto. The aim is that, with virtually vertical side walls (column 8, line 28), the cavity that is forming should be shifted downward as far as possible (column 8, lines 30 and 31).

Therefore, the subject matter of claim 1 differs from D3 in that at no point does D3 indicate that a hermetic seal results from a broader trench area, when viewed in the longitudinal direction. According to figures 4A to 4D, in the longitudinal direction, the trench always has the same width, and only in the vertical direction is the bottle shape according to figure 4B formed, which leads to cavities 36 positioned down low.

Therefore, the subject matter of claim 1 is novel (PCT Article 33(2)).

There is nothing that would prompt a person skilled in the art to propose, based on the documents cited here, a solution that involves virtually vertical side walls in the trenches and permits, and therefore does not avoid, remaining parasitic cavities, and that still enables these parasitic cavities to be hermetically sealed. The invention implements this sealing in a very special way which the prior art does not even come close to proposing, and therefore claim 1 involves an inventive step within the meaning of PCT Article 33(3).

Claims 2-4 are dependent on claim 1 and therefore likewise meet the PCT requirements for novelty and inventive step.